

BBC **SPACE WAR** THE NEW ARMS RACE ABOVE OUR HEADS

FOCUS

SCIENCE | TECHNOLOGY | HEALTH

THE POWER OF LAZINESS

WHY IT'S THE ULTIMATE EVOLUTIONARY STRATEGY

PLUS

WHY TAKING IT EASY IS GOOD FOR YOUR BRAIN, YOUR BODY AND THE PLANET



SLOWING DOWN CLIMATE CHANGE

How an Ice Age Jurassic Park could cool the planet

HAWKING'S LAST HURRAH

How his final words were beamed into a black hole

RETHINKING THE NEANDERTHALS

Why they weren't so different from us

MARTIAN DISCOVERY

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WELCOME



Laziness gets a bad rep. You see, I like to spend my time off occasionally embracing my inner loaf, but if someone asks me what I got up to at the weekend, I can't really admit that I spent the last 48 hours on my sofa, only moving for biological functions, while eating take-away pizza for breakfast and dinner. I'll admit it's not a pretty picture, but the problem is, the modern world buffers you with the idea that you've

got to do more "stuff." The kind of stuff you can regale your colleagues with on Monday and bombard your friends with on social media. And the pressure is never higher than in the summer. So for those of you with bones as lazy as mine—here's a treat. This issue we give you a whole bunch of reasons to embrace your inner sloth. I can't be bothered to share them with you here, so turn to p38 to find out more.

Summer is also a time when the changing climate becomes hard to ignore. I have some good news and some bad news. The bad news is that some scientists think that the greenhouse effect is about to get much stronger. As the Siberian permafrosts become, well, less permanent, bacteria will start to feed on the matter buried beneath the ice, releasing millions of tonnes of CO_2 into the atmosphere. The good news is that a father and son have a plan, and it involves a mammoth, some bison and a hawk... Find out what on Earth I'm talking about on 19th.

Enjoy the lesson!

Daniel Bonatti

Daniel Hertzog, Editor

IN THIS ISSUE



ANTHONY MARTINDALE-TRUSWELL

What's being debated is what it means to make a human being intelligent. Even though expert Antonio has given suggestions, however, **A 240**



NO3 EM RM CMFO

Inflammation and other large proteins could help keep the Siberian permafrost frozen, Schmidt writes and characterizes the study as preliminary. ■ **EJH**

REBECCA WRAGG
SYKES

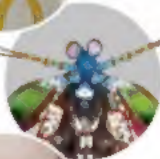
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nicht zu vernachlässigen.
Sie ist ein wichtiger Bestandteil
der Allgemeinbildung.

WHAT WE'VE FOUND OUT THIS MONTH

A dishwasher is kinder to the planet than washing up by hand.



Mr. Donald's got
the single 1.8 million
straw a day in the
hill alone is p23

[illegible]

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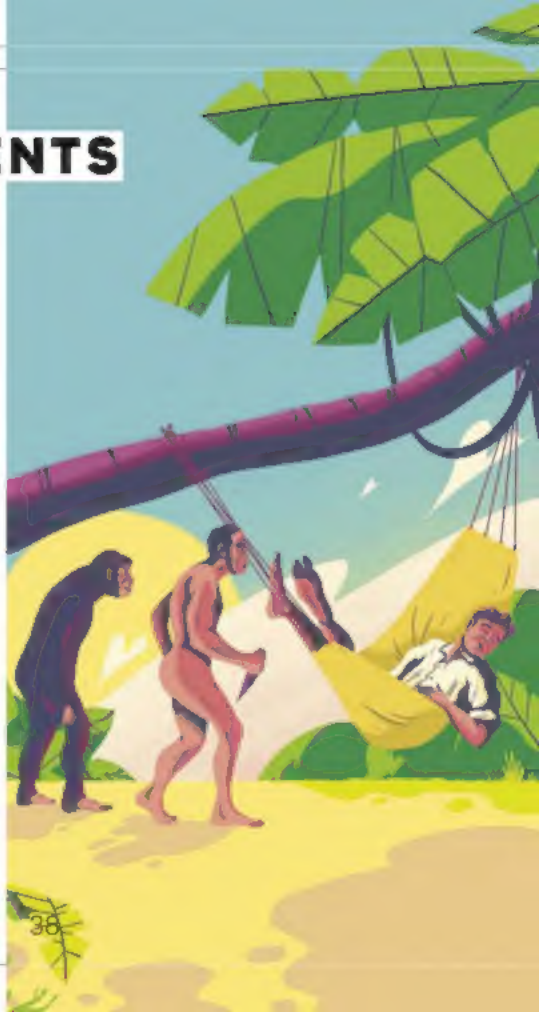
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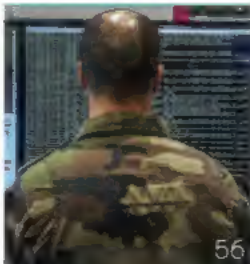
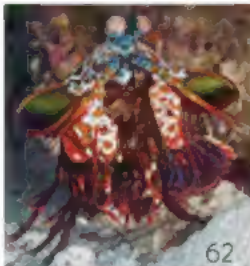
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SPECIAL ISSUE

ON
SALE
NOWMIND-BENDING SCIENCE
SIMPLY EXPLAINED

In this special edition from BBC Focus, we investigate some weird science, such as wormholes, quantum physics, space-time and gravitational waves. bbc.com/focus/mind-bending-science



EYE OPENER

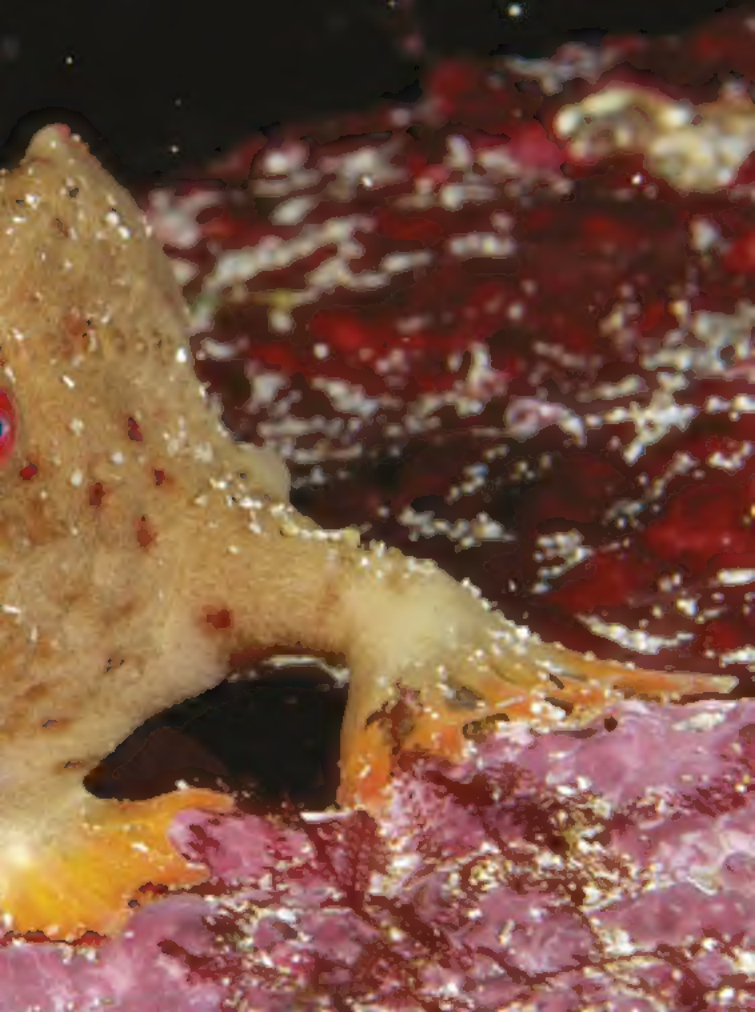
Fishy feet

TASMANIA,
AUSTRALIA

The red handfish, found off the southeast coast of Tasmania, uses its 'hands', which are modified fins, to crawl across the bottom of the seafloor. It doesn't travel very far or fast, which restricts populations to small areas.

Classed as critically endangered, it faces threats from habitat degradation and low reproductive rates. Often called the world's rarest fish, scientists only knew of one population, numbering between 20 and 40 fish, until divers discovered a second population earlier this year. "Finding this second population is a big relief as it essentially doubles the number of individuals we thought were left on Earth," says aliver Antonia Cooper. "It provides hope that other small populations may still exist and allows scientists to start discussing conservation options such as habitat protection and the viability of a captive breeding program."

PHOTOGRAPHY BY





BYE OPENER

Aviation impact

LOS ANGELES,
USA

Last year a record 84 million passengers passed through Los Angeles International Airport, pictured here. That number is growing: the International Air Transport Association (IATA) predicts that global air passenger numbers will nearly double by 2036. This leads to concerns over aviation's contribution to global carbon emissions, as it's been estimated that 2 per cent of human-made CO₂ emissions currently come from air travel.

IATA aims to deliver carbon neutral growth from 2020, and provides an offset scheme in which member states can compensate for their emissions by financing a reduction elsewhere.

Individually, the Civil Aviation Authority advises the best way to reduce your CO₂ emissions from flying is to moderate your air travel where possible, choose more modern aircraft, purchase economy tickets, and fly with airlines with lower CO₂ performance figures.



REPLY

Your opinions on science, technology and *BBC Focus*

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MESSAGE OF THE MONTH

Blind in the mind

At work recently a colleague was telling me how he discovered he had aphasia after his cousin told him about the condition and "blow his mind". Congenital aphasia is a term that was coined in 2003 to describe people with little or no mind's eye – meaning they can't conjure up pictures or even sounds/music in their heads.

It was a revelation to me as well. I didn't realise that people could 'see' and 'hear' things inside their own heads but after a lot of talk, and thanks to my response, I learnt that others can, and often experience it in a lot of detail.

I'd love to see an article about aphasia in *BBC Focus* because it apparently affects 1 in 50 people and I struggle to understand what life is like for those with a good mind's eye. Personally, my mind is generally description-based – I don't see things so much as describe them to myself, and can only 'hear' music intensely by listening the tune in my head.

Martyn Ellbride, via email

Great. Your letter's caused a lot of head scratching in the office. And it's raised a lot of questions – what appears if someone puts you to think of an elephant? Do you see the word instead of the animal? And what goes on in your head you're reading/typing? It's got us puzzled and wondering what, if any, consequences the condition carries. – *David Barnett, editor*



The EV, powered by the manufacturers of electric cars, is what by their own admission you'd think they'd do the job

Batteries not included

Why did Jack Stewart's otherwise excellent article on 'How green are electric cars?' (June, p87) not take into account the CO₂ emissions of building and recycling the vehicles. In addition to the emissions of running them? These should also be considered, especially in respect of the batteries.

Andrew Holt, via email

when the cars hit the road, where lower emissions from motoring make up the deficit in 6 to 18 months. Disproportionately taxing and recycling batteries for home energy storage, to its reuse in the road, lithium and rare earth metal ingredients, can help reduce the impact further. – *Jack Stewart*

Bucellatieri reclaimed

Reading Philip Ball's feature in July's issue (July, p83) brought to mind one of my clearest

childhood memories of a rambling holiday.

Everything had been packed away, except the tent in which my mother and I sheltered from the rain while my father went off in the car to collect something. He'd been gone a long time and we were getting worried when he and our car reappeared being towed into the site by a shore patrol



The combination of both electric and conventional cars has significant environmental impacts, and you could make a career out of quantifying them.

Luckily for us, someone has the vision of Consumer's Choice. In a 2015 analysis, they found that emissions from manufacturing cars with batteries can be 150% percent higher than a gasoline car. However, that's a one-off

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to think he had made it over the waters but perhaps my mother pointed out that although the event was tragic it did not indicate a human error.

Initially I found it impossible to believe that the two men who were at the controls of the ship had been killed in a crash that would have been the only way to explain the fact that the ship was not in the water. I had to make my mind up that the ship was not in the water and that the ship was not in the water.

Can't remember. Madmanhood

Not an exact dream

With regard to the question 'The British have nightmarish' (June 1998) however, I think that a

nightmare is a dream in which the dreamer is in a state of terror or distress. It is a dream in which the dreamer is in a state of terror or distress. It is a dream in which the dreamer is in a state of terror or distress.

What is the true meaning of the word 'nightmare'?

British probably do have nightmares, says Roger Briston

Europe, were needed pull me from bed to comb. This happened with a hip

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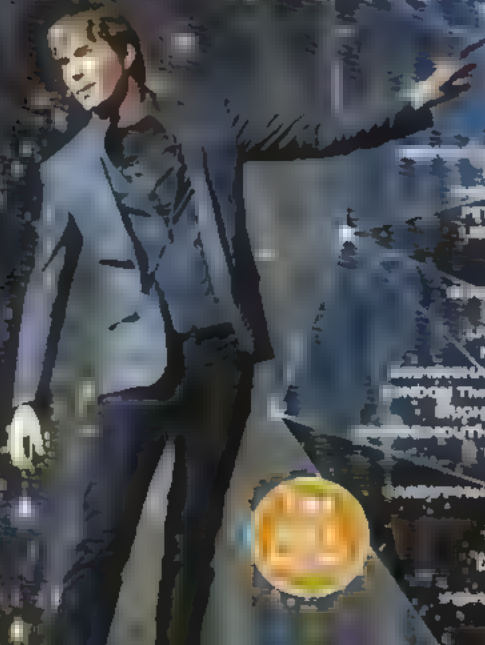


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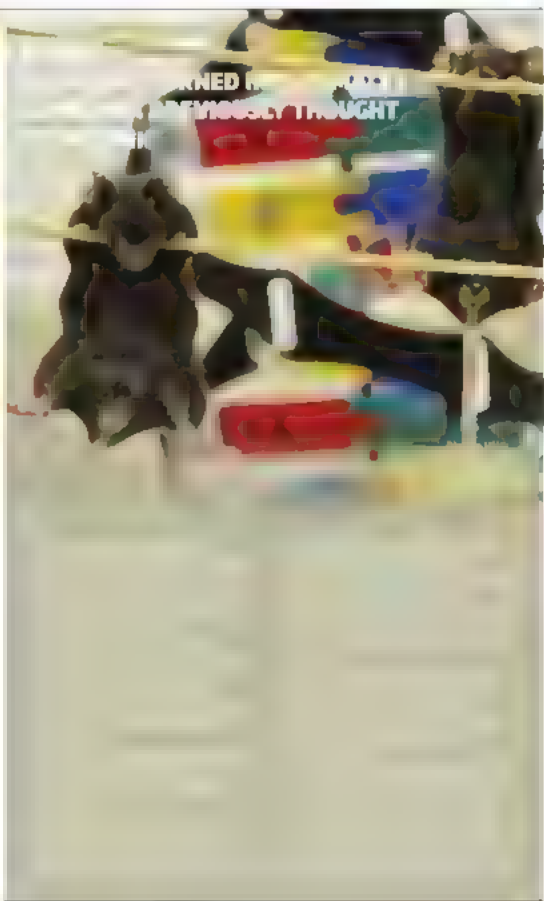
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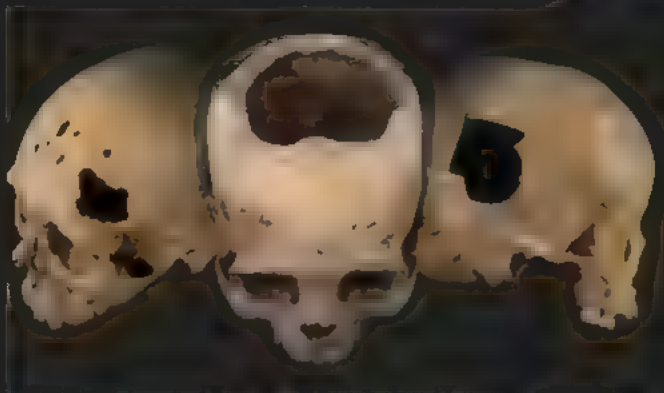
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ANTHROPOLOGY

INCA SURGEONS WERE SURPRISINGLY SKILLED AT DRILLING HOLES IN PEOPLE'S SKULLS



Remarkably, trepanation—the act of making, cutting, or drilling an opening into a person's cranium to treat everything from headaches to seizures, or even supposed demonic possession—is a practice largely confined to the past. But if you were ever in need of such an operation, you could do a lot worse than trusting out an Inca surgeon.

After analyzing 388 ancient skulls found by Peru that had undergone trepanation, a team at the University of Miami found that the procedures were carried out so expertly that the survival rate was more than 75 per cent—almost double that of those who underwent similar procedures during the American Civil War hundreds of years later. “In Incan times, the mortality rate was between 17 and 25 per cent, and during the Civil War, it was between 48 and 58 per cent. That’s a big difference,” said the third author, who led the research. “The question is, how did the ancient Peruvian surgeons have outcomes that surpassed those of surgeons during the American Civil War?”

Researchers say the post-hypothetical

man during the Civil War may have been a better-looking Incan, but little is known about exactly how the Peruvian surgeons performed the operation.

It is thought that Inca, or Incan, anatomy (the lack of it, during the Civil War) may have contributed to the higher mortality rates in the later time period. According to the study, which relied on co-author John W. Vannoy’s extensive field research on trepanation over a nearly 2,000-year period in Peru and a cockpit of the automobile, Incans were about trepanation around the world. Civil War surgeons often used unsterilized medical tools and their hands to pry open wound wounds or break up blood clots.

“We do not know how the ancient Peruvians performed trepanation, but it seems that they did a good job of it,” said Knutson. “Whether or not they used an anesthetic, but since there were no many Inca people, they must have used something—possibly coca leaves. Maybe there was something else. Maybe a fermented beverage. There are no written records, so we just don’t know.”

Modern trepanation techniques are used to treat chronic headaches. It has been found that the surgical hole allows the release of blood, reducing the pressure of the brain and relieving the pain.

Dolphins are phenomenally good at using echolocation, much better than man-made devices'

Dolphins echolocate with two-part acoustic beams. Dr Josefina Starkhammar of Lund University explains how this could help us improve ultrasound technology

After her Dolphins save us from salmon by B&B (shrimp) rights story this post of Steve Paul and why governmental prey are in the water

Why do dolphins need echolocation?

It is a common misconception that dolphins use echolocation to find food. In fact, they use it to navigate and to communicate. Dolphins have a highly developed echolocation system that allows them to create a detailed acoustic image of their environment. This is done by emitting a series of high-frequency sound waves that bounce off objects and return to the dolphin's ears. The dolphin's brain then processes this information to determine the location and size of the object.

How do they produce acoustic beams?

Dolphins produce acoustic beams using a specialized organ called the melon. The melon is a fatty, bulbous structure located at the front of the dolphin's head. It is used to focus and direct the sound waves emitted by the dolphin's vocal cords. The melon's shape and size can vary between different species of dolphins, and it is also used to store and release energy during echolocation.

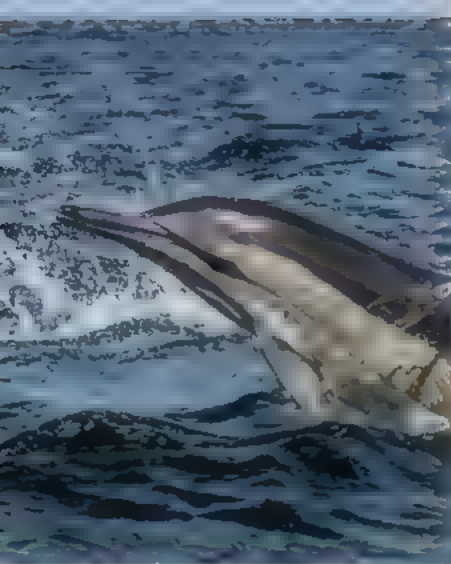
How did you study dolphin signals?

I studied dolphin signals using a combination of field and laboratory techniques. In the field, I used hydrophones to record dolphin sounds in their natural habitat. In the laboratory, I used a specialized echolocation system to study the dolphin's ability to detect and discriminate between different targets.

My research focused on the dolphin's ability to detect and discriminate between different targets. I used a specialized echolocation system to study the dolphin's ability to detect and discriminate between different targets. The system consisted of a transmitter that emitted a series of high-frequency sound waves, and a receiver that detected the reflected waves. The dolphin's brain then processed this information to determine the location and size of the target. I found that dolphins were able to detect and discriminate between different targets with a high degree of accuracy.

What did you discover about the brain?

I discovered that the dolphin's brain is highly specialized for echolocation. The brain contains a specialized region called the echolocation center, which is responsible for processing the acoustic information received by the dolphin's ears. This region is located in the midbrain and is highly developed in dolphins. I found that the echolocation center is able to process the acoustic information received by the dolphin's ears with a high degree of accuracy, allowing the dolphin to detect and discriminate between different targets.



What are the practical implications?

[illegible]

Figure 1. Schematic diagram of the experimental setup.

Number of hauls	<i>P. lineatus</i> (%)	<i>P. setiferus</i> (%)	<i>P. setulosus</i> (%)
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2	~20	~5	~5
3	~35	~5	~5
4	~55	~5	~5
5	~75	~5	~5
6	~85	~5	~5
7	~90	~5	~5
8	~95	~5	~5
9	~98	~5	~5
10	~100	~5	~5

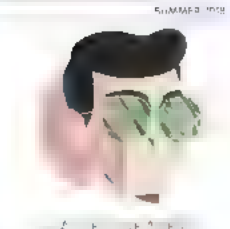
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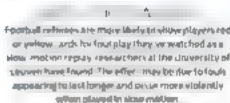
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H. GALLER, P. M. HARRIS



Want to boost the effectiveness of your team? Place a cup of Joe Around. Researchers at Ohio State University found that drinking a cup of coffee before a group or third-party participation survey calls allow higher motivation and more engaged when arriving at work.

6000 MONTH



It goes against the conventional wisdom that, because of a pressure to make a name for themselves, scientists are more likely to do it. In fact, researchers at the University of California have found it's much more likely that it may be due to us paying less attention to our experiments when we know it'll be fairly short-lived, they say.



TRENDING

Your guide to the hottest topics in the world right now

#MICROBIOME

MILK DOESN'T RESOLVE RHEUMATOID

Research from the University of California, San Diego, published in *Arthritis & Rheumatism*, found that while probiotics improved the gut microbiome in patients with rheumatoid arthritis, it did not lead to a significant improvement in disease activity or quality of life. The study, which involved 100 patients, found that the probiotics did not significantly change the levels of inflammatory markers or the number of swollen joints. However, the probiotics did lead to a significant improvement in the diversity of the gut microbiome, which is a key feature of rheumatoid arthritis.

GLYCEMIC INDEX: THE NEW DIETARY

Research from the University of California, San Diego, published in *Diabetes Care*, found that a diet based on the glycemic index (GI) led to a significant improvement in blood sugar control in patients with type 2 diabetes. The study, which involved 100 patients, found that the GI diet led to a significant improvement in HbA1c levels, which is a measure of long-term blood sugar control. The study also found that the GI diet led to a significant improvement in the levels of inflammatory markers, which are elevated in patients with type 2 diabetes.

THE NEW MICROBIOME: THE NEW DIETARY

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#CLIMATE CHANGE

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By studying, experts you recommended this for highlight

PSYCHEDELIC DRUGS MAY RESTRUCTURE THE BRAIN

The findings suggest that the use of psychedelics may lead to a restructuring of the brain, which could have implications for mental health treatment. The study found that participants who used psychedelics showed changes in brain connectivity, particularly in areas associated with self-referential thinking and social cognition. These changes were observed even after a single session, suggesting that the effects may be long-lasting.

The researchers used functional magnetic resonance imaging (fMRI) to measure brain activity during the sessions. They found that the use of psychedelics led to a decrease in activity in the default mode network, a brain network that is active when the mind is at rest. This network is involved in self-referential thinking and social cognition, and its activity is often associated with mental health conditions such as depression and anxiety.

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THEY DID WHAT?!

MATHS TAUGHT TO BEES

What did they do?

What did they find?

Why did they do that?





HAWKING'S LAST HURRAH

*The world-famous physicist and author of **A Brief History of Time** is told by past colleague Martin and Daisy*

BROUGHT TO YOU BY THE TEAM BEHIND **ASTRO**

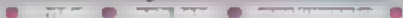
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and much, much more

"COULD DIFFERENT MEALTIMES MAKE YOU HEALTHIER?"



DR. MICHAEL MOSLEY

episode
TWO



So, it's time to get the nutrition of your meals on track. But what does that mean? It's not just about the food you eat, but also the timing of your meals.

It's not just about the food you eat, but also the timing of your meals. The timing of your meals can have a significant impact on your health. For example, eating a meal at the wrong time can lead to weight gain and other health problems.

So, what's the best time to eat? The answer is: it depends. For most people, the best time to eat is when you're hungry. But for some people, eating at a specific time can be beneficial. For example, eating a meal at the same time every day can help regulate your metabolism and improve your sleep.

So, if you're looking to improve your health, it's important to pay attention to the timing of your meals. Eating at the right time can help you lose weight, improve your sleep, and overall, live a healthier life.

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Dr. Michael Mosley
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Without Giving Up
Your Favorite Foods

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With the start of the monsoon season, Humera and her children's lives are in danger. They could be washed away in an instant by floods and mudslides. If they survive, they will be at risk of deadly infectious diseases such as cholera and diphtheria.

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INNOVATIONS

PREPARE YOURSELF FOR TOMORROW

INNOVATIONS



FLYING SOLO

By [Name] and [Name]

It's a common sight: a lone pilot in a small, single-engine aircraft, soaring over a vast, open landscape. The solitude of the sky is a powerful experience, one that has inspired countless writers, artists, and thinkers. In this article, we explore the joys and challenges of flying solo, from the thrill of takeoff to the quiet reflection of a solo flight.

For many pilots, flying solo is a rite of passage. It's a moment when you're truly on your own, with no one to rely on but yourself. This sense of independence can be incredibly empowering. It's a chance to test your skills, to push your limits, and to experience the world from a unique perspective.

However, flying solo is not without its challenges. It requires a high level of skill, focus, and decision-making. There's no one to turn to in case of an emergency, so you must be prepared for anything. The solitude can also be isolating, and the responsibility can be overwhelming.

Despite these challenges, the rewards of flying solo are many. It's a chance to connect with nature, to feel the wind in your hair, and to experience the freedom of the open sky. It's a journey of self-discovery and growth, one that every pilot should embrace.

So, if you're looking for a new challenge, a way to push your limits, and a chance to experience the world from a unique perspective, then flying solo is the way to go. It's a journey of discovery, one that every pilot should embrace.



WANTED

Search for a small, black, rectangular device with a screen, a camera, and a microphone. It should be able to connect to a smartphone via Bluetooth and have a long battery life.

James Beem
£299 (approx £194), bit.ly/robot-globe

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GAME ON



7





COULD ALGORITHMS HELP DETECT VIOLENCE?

This algorithm was developed by spotting violent behaviors (seen), and could be useful for keeping people safe in a crowd (new image)

It takes a lot of time to find out if a crowd is violent. But what if we could use a computer to help us find out if a crowd is violent? This is the idea behind a new algorithm that can detect violence in a crowd. The algorithm was developed by a team of researchers at the University of California, Berkeley. They used a large dataset of crowd images to train the algorithm. The algorithm was able to detect violence in a crowd with a high degree of accuracy. This is a significant step forward in the field of crowd analysis. It could be used to help law enforcement agencies keep people safe in a crowd. It could also be used to help researchers understand more about crowd behavior.

The algorithm was trained on a large dataset of crowd images. The dataset included images of peaceful crowds and images of violent crowds. The algorithm was able to learn the difference between the two types of crowds. It was able to detect violence in a crowd with a high degree of accuracy. This is a significant step forward in the field of crowd analysis. It could be used to help law enforcement agencies keep people safe in a crowd. It could also be used to help researchers understand more about crowd behavior.

CONCRETE CONSTRUCTION

AFFORDABLE CARBON CAPTURE TECHNOLOGY IS ON ITS WAY

Sequestration technology can be a game-changer for the construction industry, but it's not a silver bullet. It's a technology that's still in the early stages of development, and it's not clear when it will be commercially viable. However, it's a technology that's being developed by a number of companies, and it's a technology that's being tested in a number of pilot projects. The technology is being developed by a number of companies, and it's a technology that's being tested in a number of pilot projects. The technology is being developed by a number of companies, and it's a technology that's being tested in a number of pilot projects.

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This demonstration plant in Illinois is showing how carbon capture technology can be used to reduce greenhouse gas emissions from power plants.

CONCRETE CONSTRUCTION



CAMIE PAT

SuperMini Design Dynamics' robotic dog will go on sale next year. It's machine-powered, but it's not a machine. It's a dog. It's a dog that's been designed to be a companion for people who are blind or have other disabilities. It's a dog that's been designed to be a companion for people who are blind or have other disabilities. It's a dog that's been designed to be a companion for people who are blind or have other disabilities.



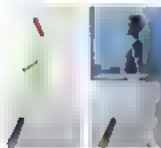
PITCH PAINTER

Nixxon's Pitch is an autonomous, standard football pitch painting machine. It's a machine that's been designed to be a companion for people who are blind or have other disabilities. It's a machine that's been designed to be a companion for people who are blind or have other disabilities. It's a machine that's been designed to be a companion for people who are blind or have other disabilities.

DRONE POLLINATION

A beehive drone has been designed to pollinate crops. It's a drone that's been designed to be a companion for people who are blind or have other disabilities. It's a drone that's been designed to be a companion for people who are blind or have other disabilities. It's a drone that's been designed to be a companion for people who are blind or have other disabilities.

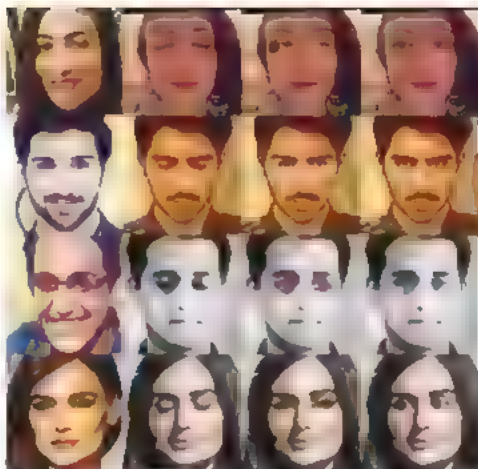
NEW AI CAN SEE THROUGH WALLS



The New York Times has a story about a new AI algorithm that can see through walls. The algorithm is called "DeepSight" and it was developed by a team of researchers at the University of California, Berkeley. The algorithm is based on a deep learning neural network that has been trained on a large dataset of images of people behind walls. The algorithm can identify the location of the person behind the wall and can even identify the person's face.

A sharp increase in security at MIT has led to the development of a new algorithm that can see through walls. The algorithm is based on a deep learning neural network that has been trained on a large dataset of images of people behind walls. The algorithm can identify the location of the person behind the wall and can even identify the person's face.

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A face-recognition algorithm in Facebook's algorithm (left) identifies images of the subjects (middle) and (right) Facebook's proposed technique (bottom right)

FACEBOOK CAN OPEN YOUR EYES

New research from Facebook's algorithm team shows that the company's algorithm can identify faces in images that are obscured by walls. The algorithm is based on a deep learning neural network that has been trained on a large dataset of images of people behind walls. The algorithm can identify the location of the person behind the wall and can even identify the person's face. The algorithm is called "DeepSight" and it was developed by a team of researchers at the University of California, Berkeley. The algorithm is based on a deep learning neural network that has been trained on a large dataset of images of people behind walls. The algorithm can identify the location of the person behind the wall and can even identify the person's face.

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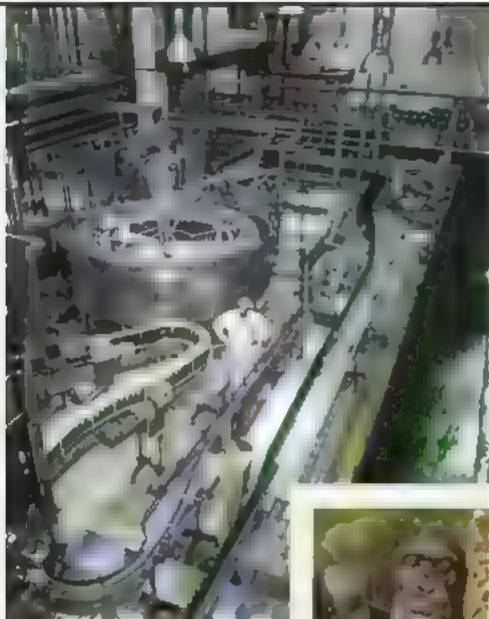
Laziness gets a bad rap. We're constantly being told we should do more, work harder, maximise productivity. But there's another side to the story. Being lazy, it turns out, can be good for both our physical and our mental health. In fact, it may even be at the heart of what makes us human – and it's certainly a successful strategy for the sloth. Over the next 14 pages, we reveal why it might be time to live life in the slow lane.

THE LAZY APE

After a long day of work, you sit down at your desk and stare at the computer screen. You're tired, but you know you have to finish up. You're not alone. In the United States, we've put them in our

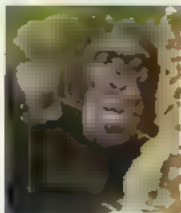
most powerful machines in the world. They're not just machines. They're our friends. They're our family. They're our everything. They're the only ones who can help us get through the day. They're the only ones who can help us get through the night. They're the only ones who can help us get through the world.





A. 100%
 B. 50%
 C. 25%
 D. 10%

W. L. C. (Chicago)
W. L. C. (Chicago)
 was raised in the
 city of Chicago.
 He was a very
 popular in the
 city of Chicago
 for his singing
 talent.

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ACHIEVE MORE BY WORKING LESS

Breaks and naps are no obstacle to a good day's work

The age-old adage that you can't have it all is a myth. You can have it all, and you can have it all at once.

It's not just a myth. It's a reality. You can have it all, and you can have it all at once. You can have it all, and you can have it all at once.

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BOREDOM HAS ITS BENEFITS

A wandering mind is a creative mind

When you're bored, your mind wanders. It drifts off to daydreams, to thoughts of the future, to memories of the past. It's a natural response to a lack of stimulation. But what if you could harness the power of your wandering mind? What if you could use it to create something new, something original, something that no one else has ever seen or heard of? That's the power of boredom. It's the power of a wandering mind.

All of us have experienced boredom at one time or another. It's that frustrating feeling of being stuck, of having nothing to do, of being bored. But what if you could turn that feeling into something positive? What if you could use that feeling as a catalyst for creativity? That's the power of boredom. It's the power of a wandering mind.

It seems that the more bored you are, the more creative you become. It's a strange phenomenon, but it's true. The more bored you are, the more your mind wanders, and the more your mind wanders, the more creative you become.

When you're bored, your mind wanders. It drifts off to daydreams, to thoughts of the future, to memories of the past. It's a natural response to a lack of stimulation. But what if you could harness the power of your wandering mind? What if you could use it to create something new, something original, something that no one else has ever seen or heard of? That's the power of boredom. It's the power of a wandering mind.

Judy Rodriguez

"Your mind wanders and you daydream and that's really important"

THE POWER OF SLOTH

1 CLAWS

Sloths are the world's only inverted quadrupeds, hanging from the trees of the tropical rainforests of South and Central America. Their toe bones are not separately movable but bound together by ligaments, which along with few curved claws act as efficient hooks for dangling upside down. Their muscles have also evolved to suit their lifestyle. They manage almost exclusively with retractor muscles like our biceps, which pull them along the undersides of branches.

STOMACH

Sloths subsist almost entirely on leaves. There are plenty of up-the-rainforest-canopy but are full of toxins and tough cellulose, making them hard to digest. To cope, sloths have evolved a four-chambered stomach, much like a cow's, and employ a host of gut bacteria to digest the leaves. It takes sloths up to a month to break down a single meal, it is happened any faster their liver might not cope, and they'd be in danger of poisoning themselves.

NECK

Sloths have up to 40 neck vertebrae more than any other mammal. Even the giraffe makes do with just seven. In 2010, scientists at the University of Cambridge discovered that these appear to have evolved from ribcage vertebrae that were co-opted over time into neck bones. The long neck allows nature's 'rough potato' to 'turn its head 270°' and graze leaves all around it without wasting precious energy moving the rest of its body.



• BODY TEMPERATURE

Sloths maintain a low core temperature of just 28°C to 32°C, whereas most mammals rely on a toasty 37°C. Rather than keeping themselves warm by stoking their internal combustion engine with calories, sloths wear a dense coat worthy of an Arctic animal. Energy from the sunshine is free, and sloths bask like lizards or soak it up like cold-blooded animals. They're also able to withstand fluctuations in their body temperature of several degrees throughout the day.

CAMOUFLAGE

With an average crawling speed of just 0.16 m/h, running from danger is not an option for the sloth. Instead, they avoid predation with their superb camouflage. Special grooves in the sloth's fur collect water and act as hydroponic gardens for as many as 80 different species of algae and fungi, as well as a wealth of insects, giving them fur a greenish hue. Each sloth is in fact a slow-moving miniature ecosystem that blends in perfectly with the trees.

STICKY RIBS

Sloths have evolved bands of tissue that anchor their guts to their lower ribs, preventing their massive stomach, which can make up as much as a third of their body weight in undigested leaves, from pressing down on their lungs. This adaptation makes breathing much less energy-intensive. Researchers have estimated that the tissue fibers reduce a sloth's energy expenditure by up to 13 per cent, which is a significant amount when you have such a low-calorie diet. 🐼

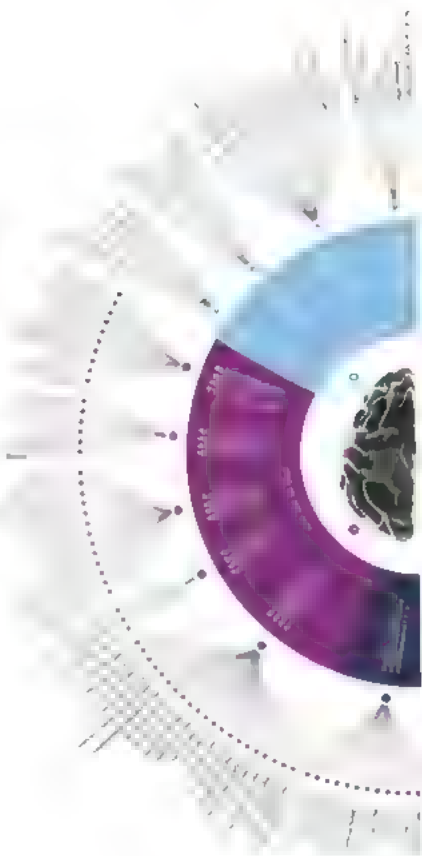
THE LAZY BRAIN

Our brains are incredible machines, but they're also somewhat lazy. In order to cope with the vast amounts of

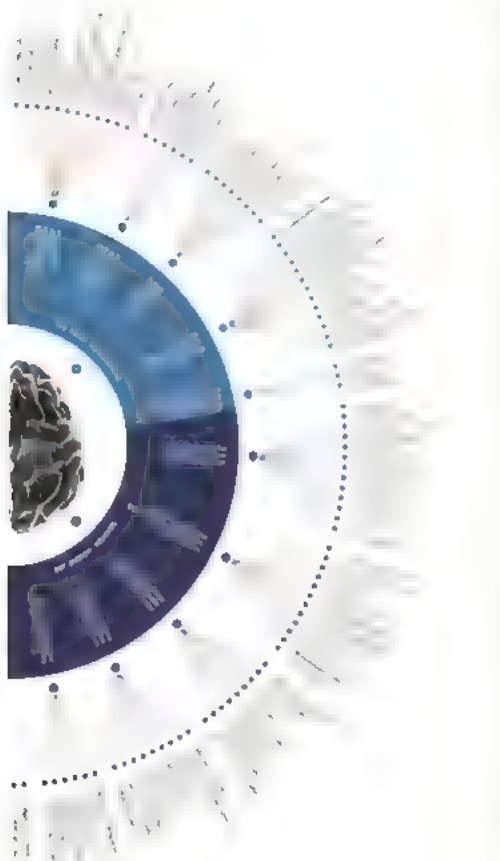
information streaming through our senses, our brains have evolved to act as quickly and efficiently as possible - saving both time and energy. But this means that they often get things wrong, as shown in this

diagram collecting together all of our common errors in judgment documented by psychologists. These are known as cognitive biases.

BY KATHARINE COLE
AND JEFF MILLER



II



The first of these is the fact that the world is not a uniform whole, but a collection of many different parts, each with its own characteristics and interests. This is the case with the human world, where different nations and peoples have different customs, languages, and ways of life. It is also the case with the natural world, where different regions have different climates, plants, and animals.

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YOU SHOULD KNOW BETTER...

Eight lazy shortcuts your brain takes that are worth bearing in mind

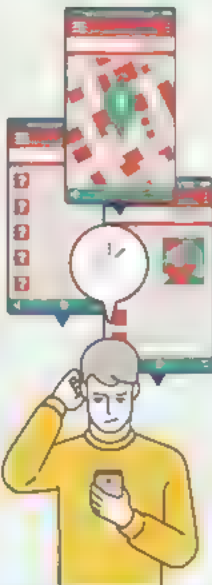
By **DAVID McKEAY**

BANDWAGON EFFECT

The tendency to follow the crowd, or bandwagon, without thinking about whether it's a good idea.

FUNDAMENTAL ATTRIBUTION ERROR

The tendency to attribute other people's behavior to their personality, rather than to the situation they're in. For example, if a friend is late, you might assume they're lazy, rather than considering they might be stuck in traffic.



GOOGLE EFFECT

The tendency to forget information that is easily accessible online, such as a phone number or a website address.

BIKE-SHEDDING EFFECT

The tendency to focus on the most visible or dramatic aspects of a problem, while ignoring the more important or complex issues. For example, a city might focus on building a new bike lane, while ignoring the need for better public transportation.

CONFIRMATION BIAS

The tendency to search for, interpret, and remember information in a way that confirms our pre-existing beliefs or hypotheses.

RHYME AS REASON EFFECT

The tendency to believe something is true simply because it rhymes. For example, "A person who is kind, will find a friend."

JUST WORLD HYPOTHESIS

The belief that the world is fair, and that people get what they deserve. This can lead to blaming victims for their misfortune, or believing that success is solely due to hard work.

PLANNING FALLACY

The tendency to be overly optimistic about the time and resources needed to complete a task. For example, a project might be planned to take 10 days, but it actually takes 20 days.



Dean Burnett

Psychology professor



on hydrog. bus 1

LAZY WAYS TO SAVE THE PLANET

Sure, you could convert your house into a solar-panelled, rainwater-harvesting no-waste eco paradise. But doesn't that all require a bit too much... well... effort? Never fear, these tips can help you greenify your life without breaking a sweat

ILLUSTRATION BY VICKI ARMBRIST

**Don't wash
your clothes**

Use a milkman

Use a dishwasher



1 Move in together

It's a well-known fact that the average American family has a car for every two people. That's a lot of cars. And a lot of cars means a lot of traffic, a lot of idling, and a lot of wasted fuel. So, if you're looking for ways to reduce your carbon footprint, one of the simplest and most effective steps you can take is to move in together. By sharing a car, you can cut down on the number of vehicles on the road, which in turn reduces the amount of fuel consumed and the amount of greenhouse gases emitted. It's a simple idea, but it can make a big difference.

5 Don't mow your lawn so often

Most people mow their lawns every week, but is that really necessary? In many cases, the answer is no. Mowing your lawn too often can actually harm the grass and the soil. It can strip the grass of its protective top layer, leaving it vulnerable to weeds and diseases. It can also dry out the soil, which can lead to increased water usage. So, if you're looking for ways to reduce your carbon footprint, one of the simplest and most effective steps you can take is to mow your lawn less often. By letting your grass grow a little longer, you can help it stay healthy and reduce the need for frequent mowing. It's a simple idea, but it can make a big difference.

6 Drive slower

It's a common misconception that driving faster is always better. In reality, driving slower can actually save you money and reduce your carbon footprint. When you drive faster, you're using more fuel, which means you're emitting more greenhouse gases. So, if you're looking for ways to reduce your carbon footprint, one of the simplest and most effective steps you can take is to drive slower. By reducing your speed, you can improve your fuel efficiency and reduce the amount of fuel consumed. It's a simple idea, but it can make a big difference.

"Typical journeys are just two minutes longer on average when driving at a steady 60mph"



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WARS



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OF LAND, SEA
AND AIR. RAPID
DEVELOPMENTS
IN TECHNOLOGY

TO NAVIGATE ON ARE
USHING CONFLICT

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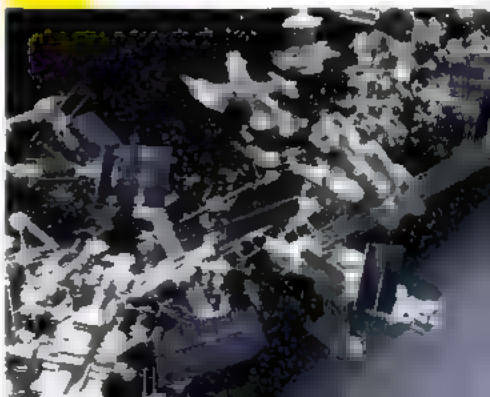
Figure 1 displays a sequence of four grayscale images of a handwritten digit '4'. The images are arranged in a 4x4 grid. The first column shows the original image. The second column shows the image after 10% degradation. The third column shows the image after 20% degradation. The fourth column shows the image after 30% degradation. The degradation is most noticeable in the second and third columns, where the digit becomes increasingly blurred and noisy.

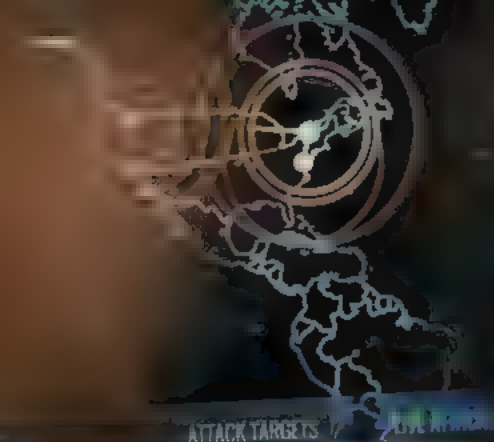
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AGREEING ON TERMINOLOGY

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By now, however, it is plain that the Americans are, tactically, not a sportsman. "We've been taken down," says the US Naval War College, Rhode Island. Six points are that any satellite with a weapon can be used to run against satellites, even though that's not what it was intended for. The US has not been creating problems for attempts to ban cruise weapons. In 1991, the Outer Space Treaty can be used by any nation on Earth. It prohibited the placement of weapons of mass destruction in space. It also forbids other types of weapons, or self-stabilizing systems. However, so, in the 2000s there was an initiative sponsored by Russia and China to continue the banning of any weapons in space. Sounds like a sensible idea but the US vetoed the treaty. "The US didn't buy into the idea of being able to non-violently define a space weapon," says Peter Ever, a civilian aerospace engineer who is also the industrial chief of the Space Information Exchange. Besides that veto, the US runs also developing space weapons that could be used to retrieve and deploy if necessary. In a clear display of strength, in 2007 the Chinese launched a satellite that shot one of their own satellites to oblivion. As for the Russians, they've had their own anti-satellite satellite since the 1980s.

REPAIR OUR SATELLITES, DISABLE OUR ENEMIES

PUT THE MANTIS SHRIMP IN GOAL!

Six animals that could power up the World Cup

With the World Cup final fast approaching, we're looking to the animal kingdom for inspiration. If FIFA were to relax the humans-only rule, these are the critters we'd want to take the field





MEERKAT

Height: 10-12 inches

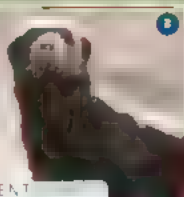
Weaknesses: No defense
in water, blind at night



MANTIS SHRIMP

Height: 1-2 inches

Weaknesses: No defense



HONEY BADGER

Height: 10-12 inches

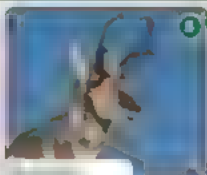
Weaknesses: No defense



DRAGONFLY

Height: 1-2 inches

Weaknesses: No defense



PRONG-HORNED ANTELOPE

Height: 10-12 inches

Weaknesses: No defense



KANGAROO

Height: 10-12 inches

Weaknesses: No defense



NEANDERTHALS

RETHINKING THE NEANDERTHALS

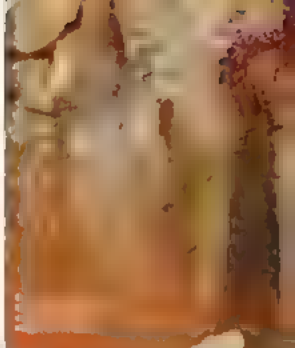
A raft of discoveries over the past few years is proving that our ancient ancestors were far from the brutish, primitive species we once thought.

WORDS BY AMY A. WEISS SYKES



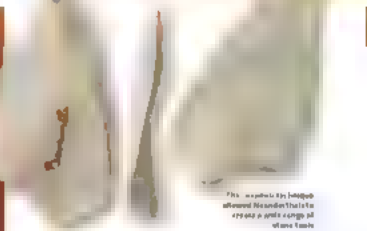
It seems to only attract
the few who want to see
the elephant and plenty of
fruit, egg and sand.

THEY WERE ARTISTS

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 \end{array}$$
[illegible]

THEY HAD FAMILIES

1. Einleitung
 2. Grundlagen
 3. Methoden
 4. Ergebnisse
 5. Diskussion
 6. Fazit
 7. Literaturverzeichnis
 8. Anhang
 9. Index
 10. Abbildung
 11. Tabelle
 12. Formel
 13. Grafik
 14. Diagramm
 15. Skizze
 16. Zeichnung
 17. Photographie
 18. Video
 19. Audio
 20. Software
 21. Hardware
 22. Netzwerk
 23. System
 24. Prozess
 25. Struktur
 26. Organisation
 27. Management
 28. Wirtschaft
 29. Recht
 30. Politik
 31. Kultur
 32. Religion
 33. Philosophie
 34. Wissenschaft
 35. Technik
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^a The mean value of the 10 trials is reported.

THEY WERE CREATIVE

[illegible]



THEY WERE HERE

For the first time, a fossilized skull of a Neanderthal has been found in the United States. The skull, which was discovered in 1994, is the first of its kind to be found in the country. It is a complete skull, with all the bones of the face and cranium. The skull is of a young adult male, and is estimated to be about 40,000 years old. It was found in a cave in the state of New Mexico. The discovery is significant because it shows that Neanderthals lived in the United States at the same time as modern humans. This suggests that the two groups may have interacted. The skull is now on display at the Smithsonian Institution in Washington, D.C.

WHY DID THEY DISAPPEAR?

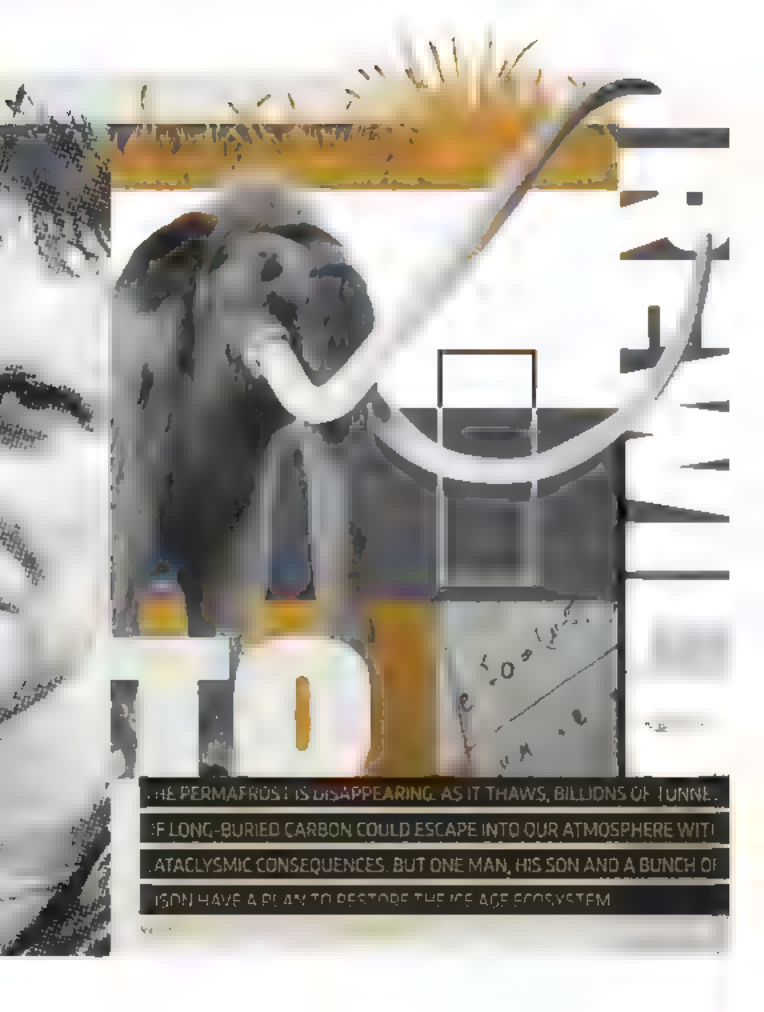
Neanderthals never really went extinct, at least not genetically. Between 30 and 70 per cent of their genetic code is in the spread among various human populations. In terms of quantity of DNA, there are actually more "Neanderthals" around now than ever. Yet between 30,000 and 40,000 years ago, their fossils disappeared from the record, as the question is why did we absorb them into our species, and not the other way around?

Frequent theories for our potential superiority have featured a larger brain, more efficient tool manufacturing, and even a mastery of symbols and art. But there still holds true certain in light of the evidence described in this article, and it's likely that a number of others played a role. While Neanderthals had lived through many periods of extreme climate change, the conditions about 50,000 years ago became extremely hostile, variable, if Homo sapiens had even marginal advantages in coping with this instability—perhaps many different weapons following us in climate change, both as extended social networks—there clear here this would have built up. On geological scales, a few more human babies surviving per year could eventually swallow into a total population replacement, especially if Neanderthals' genes were better at least by breeding with us. Their fate was a complex interplay, but a prime immediate one was ours.



Neanderthal skull and modern human skull





THE PERMAFROST IS DISAPPEARING. AS IT THAWS, BILLIONS OF TUNNELS OF LONG-BURIED CARBON COULD ESCAPE INTO OUR ATMOSPHERE WITH CATAclysmic CONSEQUENCES. BUT ONE MAN, HIS SON AND A BUNCH OF ISQNS HAVE A PLAN TO RESTORE THE ICE AGE ECOSYSTEM



was it's like, "I need to find a lot of...
the other side of the..."

So, it's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

ON THIN ICE

So, it's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

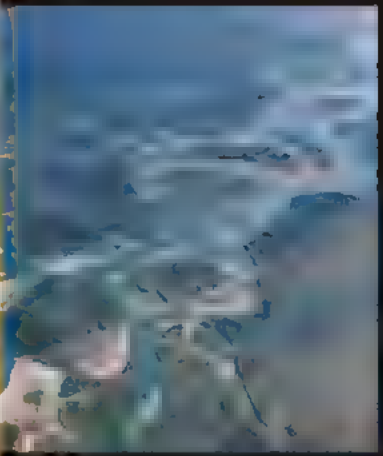
It's like, "I need to find a lot of...
the other side of the..."

It's like, "I need to find a lot of...
the other side of the..."

**"WE ARE RAPIDLY
APPROACHING THE
POINT WHERE THE
ARCTIC PERMAFROST
WILL START THAWING.
THAT WILL BE
CATASTROPHIC!"**



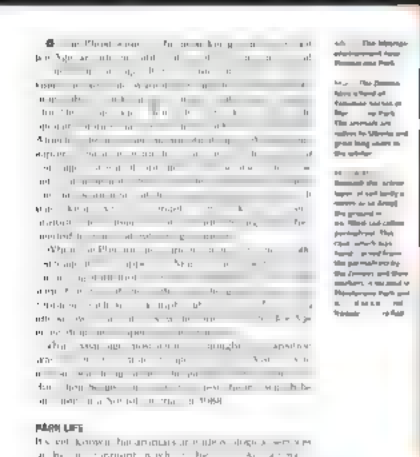
...the...
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750

12



[illegible]

PLAN LIFE

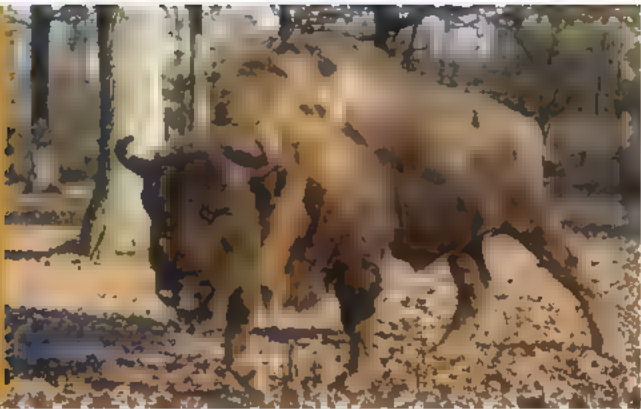
It is not known whether the animals are under a single system or if the two systems are independent. The two systems are independent.

4. The independent variable was the number of days.

1. **Die Deutsche**
 2. **Reise in Deutschland**
 3. **Deutschland ist ein**
 4. **Land mit vielen**
 5. **Städten und Dörfern.**
 6. **Die Menschen**
 7. **sprechen Deutsch.**
 8. **Die Hauptstadt**
 9. **ist Berlin.**
 10. **Deutschland ist**
 11. **ein großes Land.**
 12. **Die Menschen**
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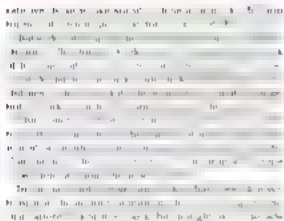
Հաստատվեց նաև, որ Երևանի
կոմունալ տնտեսության ղեկավար
Կարեն Կարամյանը և Երևանի
քաղաքապետի տեղակալ
Միլիտիան Լազարյանը
կարող են լինել իրար հակադրող
կույրերը։ Երևանի քաղաքապետ
Մարտին Բաբայանը և Երևանի
քաղաքապետի տեղակալ
Միլիտիան Լազարյանը
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կարող են լինել իրար հակադրող
կույրերը։





**"LIKE WOOLLY MAMMOTHS,
BISON ARE A KEYSTONE
SPECIES. THEY CAN FASHION
ENTIRE ECOSYSTEMS"**

[illegible]



2.1.1.1. Introduction
The first part of the paper is devoted to the introduction of the problem. The second part is devoted to the presentation of the results. The third part is devoted to the conclusion.

I received both of
 your very thoughtful
 letters in the
 follow week
 and am glad to hear
 from you.

සමස්ත ප්‍රතිඵලය

[illegible]

Das Ständige in Philip Reade

图 1 为图 1 所示的模型。

Dr P. J. H. B. van der Pijl, MSc, PhD, is a senior research fellow at the Department of Health, Behavior and Society, Harvard School of Public Health, Boston, MA, USA.





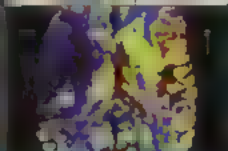
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MODEL, ACTRESS



JOHN LEGEND
SINGER, ACTOR



JODIE FOSTER
ACTRESS



MATT SMITH
ACTOR

YOUR QUESTIONS ANSWERED

Why (and how) does dew form?

BY NICK LEE

It's a common sight: a shiny, silvery droplet of dew on a grass blade or flower petal. But how does it form? The answer is simple: condensation. Dew forms when the air around a surface cools down, and the water vapor in the air condenses into liquid. This process is called condensation, and it's the same process that causes clouds to form. The only difference is that dew forms on a solid surface, while clouds form in the air.





Do any other animals play music?

ALICIA KAYE

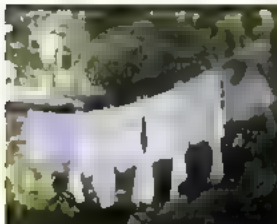
Plenty of animals have been shown to play music, and some of them are quite good at it. In fact, some animals have been shown to play music better than humans. For example, a study published in the journal *Science* in 2004 found that a group of chimpanzees in a zoo in the Netherlands had learned to play a variety of musical instruments, including a xylophone, a maraca, and a drum. The chimpanzees had been taught by a human trainer, and they had learned to play the instruments by watching the trainer play. The study also found that the chimpanzees had learned to play the instruments in a way that was similar to the way humans play them. For example, the chimpanzees had learned to play the xylophone by striking the bars with a mallet, and they had learned to play the maraca by shaking it. The study also found that the chimpanzees had learned to play the instruments in a way that was similar to the way humans play them. For example, the chimpanzees had learned to play the xylophone by striking the bars with a mallet, and they had learned to play the maraca by shaking it.

What do the other planets smell like?

WILLIAM PERKINS



As far as we know, the other planets in our solar system don't have a smell. But if they did, they might smell quite different from Earth. For example, Venus is a very hot planet, and it has a thick atmosphere of carbon dioxide. So if Venus had a smell, it might smell like a hot, sticky, carbon dioxidey gas. Mars is a very dry planet, and it has a thin atmosphere of carbon dioxide. So if Mars had a smell, it might smell like a dry, dusty, carbon dioxidey gas. Jupiter is a very large planet, and it has a thick atmosphere of hydrogen and helium. So if Jupiter had a smell, it might smell like a hot, sticky, hydrogen and heliumy gas. Saturn is a very large planet, and it has a thick atmosphere of hydrogen and helium. So if Saturn had a smell, it might smell like a hot, sticky, hydrogen and heliumy gas. Uranus is a very large planet, and it has a thick atmosphere of hydrogen and helium. So if Uranus had a smell, it might smell like a hot, sticky, hydrogen and heliumy gas. Neptune is a very large planet, and it has a thick atmosphere of hydrogen and helium. So if Neptune had a smell, it might smell like a hot, sticky, hydrogen and heliumy gas.



Why does laundry smell better if it's been hung up outside?

WILLIAM PERKINS, NOODLES

Unless you wash clothes at a 99°C spin, they will still have bacteria trapped in their fibers. The warm, damp conditions after the clothes come out of the machine will encourage growth of the bacteria, and the waste compounds they waste will create a stinky, funky smell. Hang outside. Clothes generally dry much quicker, and the ultraviolet light from the Sun kills bacteria quite effectively. In spring and summer, clothes might also keep pleasant-smelling volatile organic compounds released by plants in



Why are cats scared of cucumbers?

DEEPRONCHOSES

Cats are scared of cucumbers because they look like a snake. Cucumbers are long, thin, and green, which is very similar to the color and shape of a snake. Cats are also scared of cucumbers because they are afraid of the unknown. Cucumbers are a new and unfamiliar object to cats, and they are afraid of what might happen if they touch or eat them. Cats are also scared of cucumbers because they are afraid of the sound. Cucumbers make a soft, muffled sound when they are stepped on, and cats are afraid of this sound. Cats are also scared of cucumbers because they are afraid of the smell. Cucumbers have a strong, earthy smell, and cats are afraid of this smell.

Could climate change turn Earth into Venus?

BY MICHAEL BEARD, CHESHIRE

Venus's atmosphere is 96 per cent carbon dioxide, a dangerous powerful greenhouse effect that causes surface temperatures of up to 484°C. Earth's atmosphere, on the other hand, currently contains 0.04 per cent carbon dioxide, with trace amounts of other greenhouse gases. While greenhouse gas concentrations have been rising as we burn fossil fuels, they are still far from Venus's levels. Even if we were to burn all available fossil fuels, the likely impact on our planet's temperature would be a 2°C rise. This may seem modest by Venus's standards, but it would be enough to cause a significant rise of more than 50 metres per

How was the length of a second first calculated?

POPE AUSTON

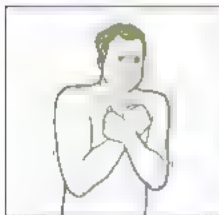


| Year | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Length of day (hours) | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 | 24.000000 |
| Length of year (days) | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 | 365.2422 |
| Length of month (days) | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 | 29.5306 |
| Length of week (days) | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 | 7.000000 |
| Length of minute (seconds) | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 |
| Length of hour (minutes) | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 | 60.000000 |
| Length of second (seconds) | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 |
| Length of millisecond (milliseconds) | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 |
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| Length of picosecond (picoseconds) | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 | 1.000000 |
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THE THOUGHT EXPERIMENT

WHAT IF HUMANS HAD CHLOROPHYLL IN THEIR SKIN?



1. WE'D STILL NEED TO EAT

Photosynthesis is only 3 to 6 per cent efficient. If you stood naked outdoors all day, you would generate less than 240 calories, about three chocolate digestive biscuits worth. If you weren't eating anything to supplement this, photosynthesis wouldn't even be enough to offset the heat your naked body would lose. You'd die of hypothermia before you'd starved.



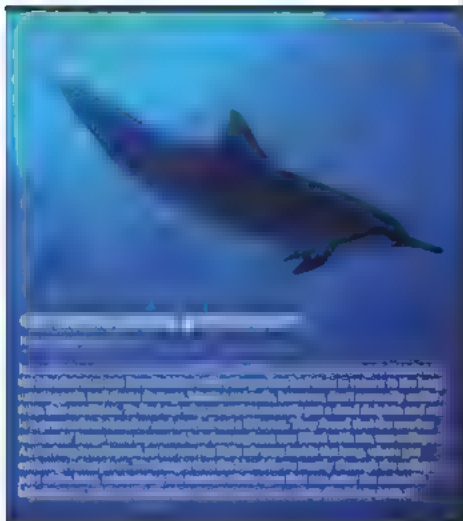
2. WE'D STILL NEED OXYGEN

Plants generate all the oxygen they need as a by-product of their own photosynthesis. But since you'd need to eat extra food to power your more active metabolism, you'd also need to breathe extra oxygen in order to convert all of that food into energy. Photosynthesis would let you lower your breathing rate by 10 per cent at most. Photosynthetic astronauts would still need oxygen tanks.



3. WE MIGHT NOT EVEN BE GREEN

Most plants need light to synthesise chlorophyll. If humans used the same mechanism, our skin would only be green where it was exposed to the sun. Office workers and many people in northern latitudes probably wouldn't get enough sunshine to tint their skin more than pale yellow, except on their face and hands. Those working rolling shifts might cycle between green and white.



Why do we find puppies so cute?

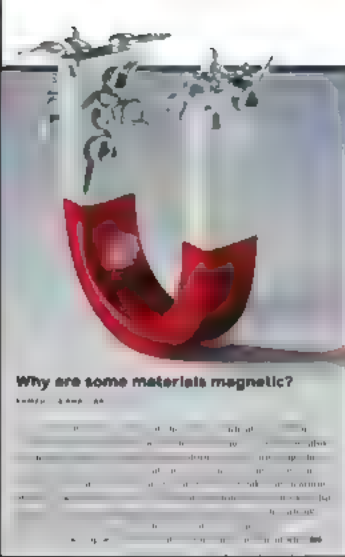
ANNE D. HOPKIN

When you see a puppy, you know it's a cute little dog. But why do we find puppies so cute? The answer lies in the way puppies are designed to look. They have large, round eyes, a small nose, and a tiny mouth. These features make them look like they are in need of protection and care. This is why we feel a strong urge to protect and nurture them. Puppies also have a soft, fluffy texture that makes them feel like a warm blanket. All of these things combine to make puppies so irresistible to us.



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Why are some materials magnetic?

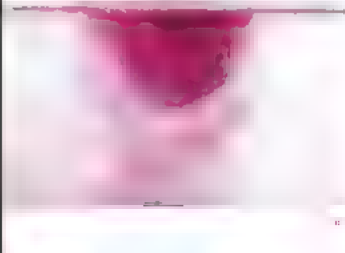
by [Katie](#) & [Amy](#) 3/11/14

Hi! We're Katie and Amy, and we're 11 years old. We're from the United States and we're in 5th grade. We're interested in science and we like to learn about magnets. We want to know why some materials are magnetic and why some are not. We also want to know how magnets work and how they are used in everyday life. We hope you can help us with our questions. Thank you!

What causes bath bombs to fizz?

by [Katie](#) & [Amy](#) 3/11/14

Hi! We're Katie and Amy, and we're 11 years old. We're from the United States and we're in 5th grade. We're interested in science and we like to learn about bath bombs. We want to know what causes bath bombs to fizz and how they are made. We also want to know how they are used in everyday life. We hope you can help us with our questions. Thank you!



[illegible][illegible]

They react slowly with water slowly when you are tired. But in practice you're not sleeping.



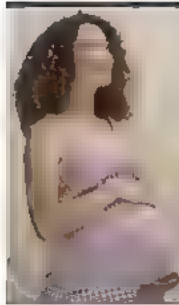
The complex interaction of a large number of factors in the blood pressure and other clinical and epidemiological studies has not been able to explain the



Հայաստանի Հանրապետության Կոնստիտուցիոն Սահմանադրության
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 141-րդ հոդվածի 4-րդ կետի համաձայն՝ Կոնստիտուցիոն Սահմանադրության



Blind students are not allowed to use a calculator.



Is it possible to get pregnant when you're already pregnant?

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

IN NUMBERS

100

WHAT IS THIS?

Woolly Frog (Hyla arenicolor)
While it might look like a pair of little glowing lights, this is actually the inflated vocal sac of a quaking frog. The quaking frog, which is native to Brazil, Venezuela and Bolivia, pumps up its vocal sacs when it croaks, and the sacs then vibrate together to create a quaking sound. When it doesn't vibrate, the frog will produce a loud and noisy croaking sound at night. www.froggy.com for more on quaking.



WHO FIRST CLAIMED?

PLANETS GO ROUND THE SUN



Is there a theoretical upper limit to human life?

by JEFFREY J. ARON



What is the maximum number of planets that can orbit a star?

The answer to this question depends on the mass of the star and the distance of the planets from it. In general, the more massive the star, the more planets it can support. However, there is a theoretical upper limit to the number of planets that can orbit a star, which is determined by the total mass of the system. If the total mass of the planets exceeds the mass of the star, the system will become unstable and the planets will be ejected or destroyed.

How many planets can orbit a star?

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Does it take more effort to swim in the deep end of a pool than the shallow end?

by JEFFREY J. ARON

The answer to this question depends on the depth of the pool and the position of the swimmer. In general, it takes more effort to swim in the deep end of a pool than in the shallow end, because the swimmer has to move more water to stay afloat. However, the effort required also depends on the swimmer's technique and the speed at which they are swimming.

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How long would it take an astronaut to reach the Moon?

THEIR HOT DATE



The first time a human stepped onto the Moon was in 1969, and it took the Apollo 11 crew about 28 hours to get there. But if you were to launch today, it would take about 3 to 4 days to reach the Moon, depending on the launch window and the spacecraft's speed. The Apollo 11 mission was the only one to land on the Moon, and it was a huge achievement for humanity.



Are VR headsets bad for your health?

THEir HOT DATE

VR headsets can be bad for your health if you use them for too long. They can cause eye strain, headaches, and motion sickness. Some people also experience a sense of disorientation or nausea. It's important to take breaks and use them in a well-ventilated area. If you have any pre-existing conditions, it's best to consult with a doctor before using a VR headset.

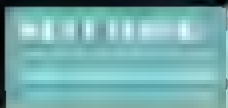
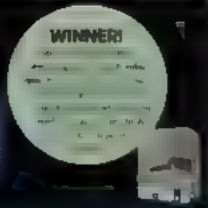
VR headsets can also be good for your health. They can help with physical therapy, pain management, and mental health. Some studies have shown that VR can be used to treat anxiety, depression, and PTSD. It can also be used to help people with physical disabilities to improve their motor skills. So, while VR headsets can be bad for your health if used incorrectly, they can also be a great tool for improving your health.

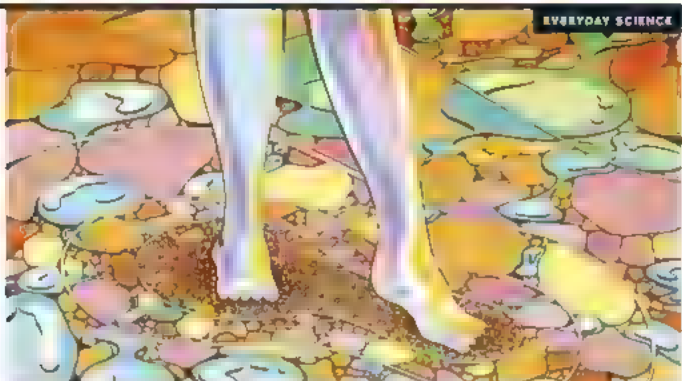
QUESTION OF THE MONTH

What is the Universe expanding into?

THEir HOT DATE

Presently we do not know how big the universe is, nor do we know whether the universe is infinite or not. If the universe is infinite, then it can simply keep expanding without getting any bigger because you can't get bigger than infinity. It's therefore not expanding into anything. On the other hand, if the universe is finite to extend, this question becomes impossible to answer, since—being part of the fabric of the universe—ourselves—we have no way of looking outside it, no.





WHY DOES SAND GO DRY WHEN YOU STEP ON IT?

The next time you step on sand, you'll notice it's wet. But when you step on it again, it's dry. Why?

The answer lies in the way sand is made. Sand is made of tiny grains of rock and minerals. When you step on sand, the grains are pushed together, and the air between them is squeezed out. This makes the sand feel wet. But when you step on it again, the grains are pushed apart, and the air is squeezed back in. This makes the sand feel dry.

So, the next time you step on sand, you'll notice it's wet. But when you step on it again, it's dry. Why? The answer lies in the way sand is made. Sand is made of tiny grains of rock and minerals. When you step on sand, the grains are pushed together, and the air between them is squeezed out. This makes the sand feel wet. But when you step on it again, the grains are pushed apart, and the air is squeezed back in. This makes the sand feel dry.

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DR HELEN CZARSKI



OUT THERE

WHAT WE CAN'T WAIT TO DO THIS MONTH

01

AVATAR: THE WAY OF WATER
20TH CENTURY FOX
STARTS NOW
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MARVEL AT THE INVISIBLE

This summer, the Silver Project's new generation exhibition called Invisible Worlds examines the parts of the planet that exist beyond our senses. A construction of Invisible Worlds in Infinity Room, which is an innovative 3D-tissue sculpture that celebrates symbiogenesis. Why should we care about those? Well, they are the organisms that gave us a living-breathing world when they started to photosynthesize around 2.4 billion years ago, releasing free oxygen into Earth's atmosphere and changing the nature of our planet.

Infinity Room features 3D canvases that project colorful vapor rings, which were developed to represent the system of the primordial world. To create the smooth, colorful Studio Motion collaborated with Paris-based perfume house Givaudan.

"Infinity Room gives physicality to the invisible elements of our existence: depends on our breathable atmosphere, microbial life and deep time," says Studio Motion.

Nowhere, you can go as much to discover various emotions and what they do you can become part of the Silver Project's digital installation and watch as matter flows in and out of your body; and then you can find outside in travel through Kline's Cellular Gardens and learn what's in the 20,000 breaths we take every day.





THE SCIENCE OF SIN

BY ALAN EMERY

How do we know what's right and wrong?

Can we tell if someone's plotting by looking at their brain?

What are the cues that tell us when we're about to do something wrong?

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UNDERSTAND SIN

How do we know what's right and wrong? Can we tell if someone's plotting by looking at their brain? What are the cues that tell us when we're about to do something wrong?

What are the cues that tell us when we're about to do something wrong?

When we're about to do something wrong, our brain sends us a series of cues. These cues are often subtle, but they can be detected by a trained observer. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern. These cues are often subtle, but they can be detected by a trained observer. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern.

Can we tell if someone's plotting by looking at their brain?

Yes, we can. Recent advances in brain imaging technology have allowed scientists to see what's going on inside a person's head while they're thinking. This has led to the development of techniques that can detect when someone is plotting a crime. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern. These cues are often subtle, but they can be detected by a trained observer. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern.

Which other cues cause the brain to act up?

There are many other cues that can cause the brain to act up. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern. These cues are often subtle, but they can be detected by a trained observer. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern.

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What can neuroscience tell us about sin?

Neuroscience has shown us that sin is not just a matter of choice, but it's also a matter of biology. Our brain sends us a series of cues that tell us when we're about to do something wrong. These cues are often subtle, but they can be detected by a trained observer. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern. These cues are often subtle, but they can be detected by a trained observer. For example, a person who is about to lie will often have a slight frown or a change in their breathing pattern.

AUTHOR'S BOOKSHELF



THE BUILDING BRAIN

BY ALAN EMERY

This book explores the science of the brain and how it affects our behavior. It's a great read for anyone interested in neuroscience and psychology.



THE BRAIN THAT CHANCES ITSELF

BY ALAN EMERY

This book explores the science of the brain and how it affects our behavior. It's a great read for anyone interested in neuroscience and psychology.



BELIEVING FOR ATHEISTS

BY ALAN EMERY

This book explores the science of the brain and how it affects our behavior. It's a great read for anyone interested in neuroscience and psychology.

FIND OUT MORE

Listen to our interview with Alan Emery on the science of sin podcast. Visit sciencefocus.com/sciencepodcast

06

LIFE AT THE EDGE

 BY
DUBLIN SLING SLACKERTY

EXPERIENCE THE EXTREME

People say that the world is a stage, but the world is a stage.

The world is a stage, but the world is a stage.

The world is a stage, but the world is a stage.

The world is a stage, but the world is a stage.

The world is a stage, but the world is a stage.

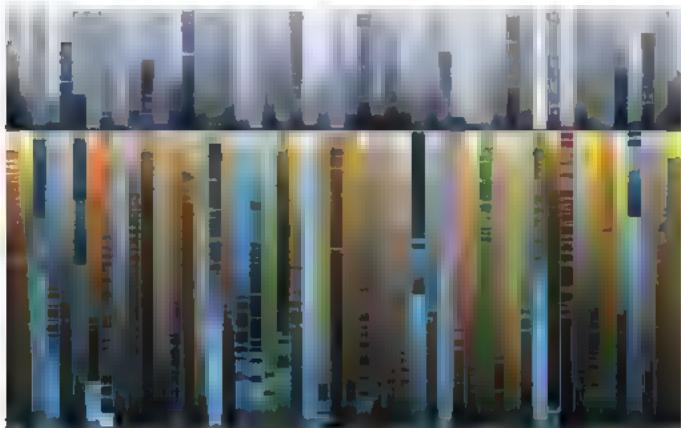
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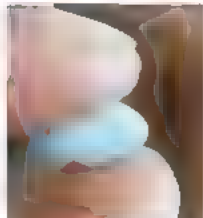
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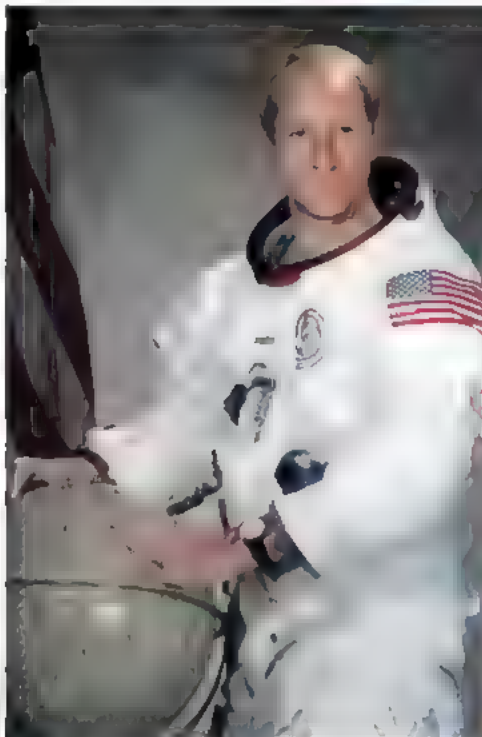
The world is a stage, but the world is a stage.


 THE GERMANS
OF ACCIDENTS

CELEBRATE ACCIDENTS

In 1990, the German philosopher Jürgen Habermas wrote a book called *The Structural Transformation of the Public Sphere*. In it, he argued that the public sphere, which is the space where people come together to discuss and debate issues of public concern, has been transformed by the rise of mass media and the internet. He argued that the public sphere is no longer a space where people can come together and discuss issues of public concern, but rather a space where people are isolated and disconnected from each other. This is a problem, he argued, because the public sphere is essential for a healthy democracy. Without a public sphere, there is no way for people to voice their concerns or to hold their leaders accountable. Habermas's argument is a warning about the future of democracy in a world of mass media and the internet.





ESCAPE EARTH



MOON, MARS
AND BEYOND

By [illegible]
Illustration by [illegible]

With destinations ranging from the Moon to Mars, the possibilities for space exploration are endless. But what if we could escape Earth altogether? The idea of living on other planets has long been a dream, but now it's becoming a reality. With advances in space technology, we're closer than ever to making the leap. From the Moon to Mars, the possibilities are endless. But what if we could escape Earth altogether? The idea of living on other planets has long been a dream, but now it's becoming a reality. With advances in space technology, we're closer than ever to making the leap. From the Moon to Mars, the possibilities are endless.

LISTEN UP

Live in the countryside? Tied up in the evening? Too busy simultaneously watching your children, passing a bucket and painting the kitchen? Want to get to any event? You need to get your science fix via a podcast. Here are our favourites.



SCIENCE 9-5

If you want to, who doesn't? It's the only daily podcast that's a mix of science and pop culture.

group of friendly, go-to people who discuss and discuss. It's a mix of science and pop culture. It's the only daily podcast that's a mix of science and pop culture. It's the only daily podcast that's a mix of science and pop culture.



INVISIBLE

This podcast explores the hidden forces that shape human behaviour.

Such as the idea of a 'hidden' and emotional human. It's a mix of science and pop culture. It's the only daily podcast that's a mix of science and pop culture. It's the only daily podcast that's a mix of science and pop culture.



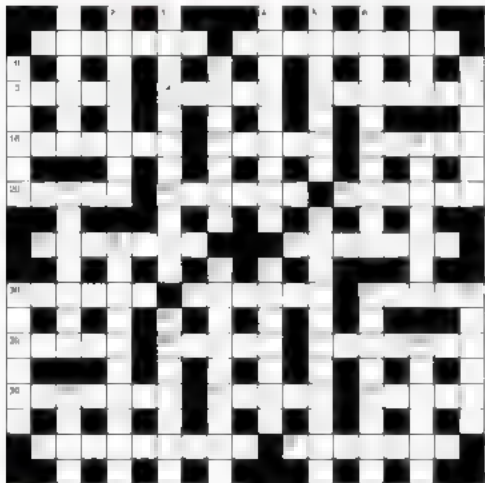
SCIENCE FOCUS PODCAST

While we're biased, but we think this one's pretty good.

Each week a BBC Four team member has a deep dive that with one of the brightest minds in science, technology and health about the ideas and break-throughs that influence our understanding of the world.

BBC FOCUS CROSSWORD

GIVE YOUR BRAIN A WORKOUT



- 1 Shapely bend starts as a vitamin deficiency (6)
- 2 Slightly limited north-western hair (8)
- 3 Drug makes weak hair at the top with circulation (4)
- 4 Prevent fellow getting (anoid) (9)
- 5 Outdoors, hair gets a little first (7)
- 6 But probably in good hairbreakable (10)
- 7 Hair and a little more (4)
- 8 Reaches a preliminary warning (6)
- 9 This is a good hair break on another
- 10 Hair is a good hair break on another
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- 1 Sunday taxi drivers reject combidancer's third complaint
- 2 Hair and a little more (4)
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ANSWERS

For the answers, visit bbc.com/crossword. Diggle is available on the website address is case sensitive



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Dr Eugenia Cheng

Mathematician and pianist Eugenia Cheng talks to Helen Pilcher about maths, music, cake, and why it's good to get things wrong

Eugenia Cheng has written the six volumes of the *Maths As You See It* series, which includes *Maths As You See It: The Art of Thinking* and *Maths As You See It: The Art of Learning*.

What do you do?

I teach, talk and write about maths, and research abstract algebra. I'm also on a mission to rid the world of maths phobia.

Why are people maths phobic?

Part of the problem is the way maths is taught. So much is about following rules and getting the right answer, but this can be confusing. If kids get things wrong it can make them feel stupid, so it's self-putting.

How should maths be taught?

We should teach maths so it's less about getting the right answer, and

more about investigation and discovery. Maths isn't just about numbers, it's about thinking. I teach maths to university art students by getting them to cut stuff out and stick it together. They discover that triangles are a good shape for covering surfaces. That's quite a profound mathematical insight. In my ideal scenario, the education system would focus less on test results and trust teachers to know how the students are doing. Food can be motivating too.

Mmm... food. I'm maths of cake?

Why not? Food can be really

motivating. Maths is like cooking. You add different things together and see what you get. I use Bûche de Noël cake when I'm teaching group theory to my second-year maths students because its structure is a piece of high-level maths.

How do you relax?

I'm a classically trained pianist, so I play the piano. I play Bach every day because it aligns my brain and satisfies my soul, but I also enjoy bebop because it's less technically challenging but musically fulfilling.

Isn't maths and classical music both a bit highbrow?

People often think that unless they've studied them and passed tonnes of exams, those subjects are off limits. That's a shame. You don't need to be able to do maths or play music in order to appreciate it, just like you can go into a museum and appreciate paintings without being an artist. I try to bring classical music to a wider audience.

Are maths and music linked?

They're both about structure. You need to understand the internal structure of a complicated piano piece or mathematical problem in order to get your head around it.

Any bad habits you'd care to admit?

I'm a spectacular procrastinator. There are also times when I get stuck at work and the only thing that unsticks me is having something to eat. I find that really annoying.

Where is your favourite place?

I live being by the sea. I grew up in Brighton so have an affinity to seaside beaches. I also love the beach in Nice, where I worked for a year. It's like Brighton, but warmer. ☀

Dr Eugenia Cheng is awarded an honorary at the School of the Art Institute of Chicago. Her new book, *The Art of Thinking*, How to Solve Problems in a World That Doesn't (p.14-95) Profile Books is out now.

DISCOVER MORE

To learn more about the *Art of Thinking* with Dr Eugenia Cheng, visit bit.ly/eugenia_cheng

NEXT ISSUE: ALICE ROBERTS

"MATHS IS LIKE COOKING. YOU ADD DIFFERENT THINGS TOGETHER AND SEE WHAT YOU GET"



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